Cal/Ecotox
Exposure Factors for Snowy Plover (Charadrius alexandrinus)*

Endpoint Type	Endpoint Value	Error	Range	Units	Sex	Life Stage	Location	Note	Reference
Body Weight - Mean	42.2	3.0 SD		g	F	Adult	SPAIN	a	1
Body Weight - Mean	43.1	2.8 SD		g	M	Adult	SPAIN	b	1
Body Weight - Mean			33.2-34.0	g	NR	Adult	Lab	c	2
Body Weight - Mean	6.33	0.56 SD	5.3-7.6	g	B	Hatchling	SPAIN	d	1
Clutch or Litter Size	3		2-4	eggs/clutch	F	Adult	Monterey; CA	e	3
Clutch or Litter Size	3		2-5	eggs/clutch	F	Adult	UT	f	4
Clutch or Litter Size	2.55	0.69 SD	1-3	eggs/clutch	F	Adult	MEXICO	g	5
Clutch or Litter Size	2.63		1-3	eggs/clutch	F	Adult	SPAIN	h	1
Clutch or Litter Size	2.69 (1991), 2.54 (1992)			chicks/nest	B	Hatchling	SPAIN	i	1
Clutches or Litters per year	2			clutches/yr	F	Adult	Mono; CA	j	6
Duration of Incubation or Gestation	26.9		25-32	d	B	Embryo	Mono; CA	k	6
Duration of Incubation or Gestation	27.4	0.2 SE	26-32	d	B	Embryo	Monterey; CA	l	3
Fledging or Weaning Rate	1.87			chicks/brood	F	Adult	UT	m	4
Fledging or Weaning Rate	19.3%			%	B	Both Adult and Juv.	SPAIN	n	1
Fledging or Weaning Rate	2.0			fledglings/brood	NR	Fledgling	Marin; CA	o	7
Fledging or Weaning Rate	1.64			fledglings/brood	NR	Fledgling	Mono; CA	p	6
Fledging or Weaning Rate			39-42	d	NR	Fledgling	Monterey; CA	q	3
Fledging or Weaning Rate	92.7			%	NR	Juvenile	Monterey; CA	r	3
Foraging Distance	177	25%-75% quartiles=64-466	up to 3770	m	F	Adult	UT	s	4
Foraging Distance	272	25%-75% quartiles=110-580	up to 2030	m	M	Adult	UT	t	4
Growth Rate	0.105			g/day per g body mass	B	Juvenile	SPAIN	u	1
Hatching Success	27.6% (1991), 16.1% (1992)			%	B; B	Both Adult and Juv.; Embryo	SPAIN; SPAIN	v	1
Hatching Success	27.6% (1991), 16.1% (1992)			%	B; B	Both Adult and Juv.; Embryo	SPAIN; SPAIN	w	1
Hatching Success	37			%	NR	Hatchling	Marin; CA	x	7
Hatching Success			39.5-68.2	%	NR	Hatchling	Mono; CA	y	6
Hatching Success	55.2			%	NR	Hatchling	Monterey; CA	z	3
Hatching Success	58.2			%	NR	Hatchling	Monterey; CA	aa	3
Hatching Success	1.73	0.78 SD	1-3	chicks/brood	NR	Hatchling	MEXICO	ab	5
Hatching Success	13			%	NR	Hatchling	OR	ac	8
Longevity	2.7			yr	B	Adult	UT	ad	9
Longevity	7-00			yr-mo	NR	Adult	USA	ae	10
Population Density			0.054-0.275	nests/ha	B	Adult	UT	af	11
Population Density			0.078-0.493	nests/ha	B	Adult	UT	ag	11
Population Density	6.2 (fall), 19.2 (winter), 6.6 (spring)			birds/ha	NR	NR	Marin; CA	ah	12
Population Density	1.9 (fall), 3.4 (winter), 1.1 (spring)			birds/ha	NR	NR	Marin; CA	ai	12
Population Density			0.45-7.73	birds/km	NR	NR	CA	aj	13

Exposure Factors for Snowy Plover (Charadrius alexandrinus)*

Endpoint Type	Endpoint Value	Error	Range	Units	Sex	Life Stage	Location	Note	Reference
Population Density			0.24-2.51	birds/km	NR	NR	CA	ak	13
Survival/ Mortality	0.743				B	Adult	Monterey; CA	al	6
Survival/ Mortality	0.687				B	Adult	UT	am	9
Survival/ Mortality	72.6			%	F	Adult	Monterey; CA	an	3
Survival/ Mortality	0.778				M	Adult	Mono; CA	ao	6
Survival/ Mortality	78.6			%	M	Adult	Monterey; CA	ap	3
Survival/ Mortality	0.643				NR	Juvenile	Marin; CA	aq	6
Territory Size	<0.5			ha	B	Adult	Monterey; CA	ar	3
Time of Fledging or Metamorphosis	30.9		29-33	d	NR	Fledgling	Monterey; CA	as	3
Time of Mating/ Laying	April, May				B	Adult	OR	at	8
Time of Mating/ Laying	April 18 to July 15				F	Adult	Mono; CA	au	6
Time of Mating/ Laying	Mar 23 to Jul 13				F	Adult	Monterey; CA	av	3
Time of Mating/ Laying	Apr 10-Jul 18				F	Adult	UT	aw	4
Time of Mating/ Laying	March 29-June 25 (1991), March 11-June 29 (1992)				F	Adult	SPAIN	ax	1
Time of Migration or Dispersal	Mar 9 (females), Mar 24 (males)				B	Adult	Monterey; CA	ay	3
Time of Migration or Dispersal	late Mar to mid Jun				F	Adult	UT	az	4
Time of Migration or Dispersal	late Mar to May 31; Jul 1-15				M	Adult	UT	ba	4
Time of Migration or Dispersal	early March to April 26				NR	Adult	Monterey; CA	bb	14
Time of Migration or Dispersal	early to late March				NR	Adult	CA	bc	15
Time of Nesting	April 18 to July 6				B	Adult	Mono; CA	bd	6
Water Ingestion Rate	20			%	NR	Adult	Lab	be	2

Notes

a mean body weight; N=158; Fuente de Piedra lake, s. Spain
b mean body weight; N=154; Fuente de Piedra lake, s. Spain
c range in average body weights of treatment groups; N=3-4 birds/group
d mean body weight at hatching; N=47; Fuente de Piedra lake, s. Spain
e most frequent clutch size; N=171 nests; Pajaro River Mouth
f modal clutch size; N=327 clutches; Mar to Aug; Great Salt Lake, Davis County
g mean clutch size; N=36 nests; May-Jun; Baja California peninsula
h clutch size; N=316 nests; Fuente de Piedra lake, s. Spain; 73.4% of nests contained 3 eggs.
i mean numbers of chicks hatched per successful nest; N=26 (1991), 35 (1992) nests; Fuente de Piedra lake, s. Spain
j number of clutches laid by 30 out of 81 total nesting females; N=81 nesting females; Apr to Sep; Mono Lake (elev. 1,940 m)
k incubation period; N=9 nests; Apr to Sep; Mono Lake (elev. 1,940 m)
l average incubation period (measured from last egg laid to last egg hatched); N=57 nests; Pajaro River Mouth; Earlier nests averaged longer incubation periods than later nests.
m average number of chicks fledged per successful brood; N=3 yrs data collection; Mar to Aug; Great Salt Lake, Davis County; Mean annual nest success (Mayfield method) was 5.4-49.2% (Howard Slough), 11.3-38.1% (Layton Marsh)
n Percent of nests in which at least one chick hatched.; N=316 nests; Fuente de Piedra lake, s. Spain
o number of young fledged per successful brood; N=35 nests; Point Reyes; Seventy-nine percent of broods fledged young.
p number of chicks fledged per successful brood (for one year); N=22 nests; Apr to Sep; Mono Lake (elev. 1,940 m)
q percent of hatched chicks that fledged (over 6 years); N=296 chicks; Pajaro River Mouth
r percent of 16 day old chicks that fledged; N=124 birds; Pajaro River Mouth; Most chick mortality occurred before 6 days of age (see citation for figure of proportion of chicks lost by age).
s median foraging distance from nest; N=192 observations; Mar to Aug; Great Salt Lake, Davis County
t median foraging distance from nest; N=266 observations; Mar to Aug; Great Salt Lake, Davis County
u growth rate; N=42; Fuente de Piedra lake, s. Spain
v percent of all eggs that hatched; N=254 (1991), 554 (1992) eggs; Fuente de Piedra lake, s. Spain

w	percent of all eggs that hatched; N=254 (1991), 554 (1992) eggs; Fuente de Piedra lake, s. Spain
x	percent of eggs that hatched; N=35 nests; Point Reyes; Forty percent of nests hatched at least one egg.
y	range in percent of clutches hatching at least one chick (over 4 years); N=NR; Apr or May to Aug or Sep; Mono Lake (elev. 1,940 m)
z	percent of all eggs that hatched (over 6 years); N=534 eggs; Pajaro River Mouth
aa	percent of clutches in which at least one egg hatched (over six years); N=189 nests; Pajaro River Mouth
ab	average number of chicks per successful brood; N=119 broods; May-Jun; Baja California peninsula
ac	proportion of nests with at least one egg hatching; N=72 nests; coast
ad	mean life expectancy for an adult plover, based on survival estimate; N=361 birds captured over 3 yrs; Great Salt Lake
ae	from USFWS Bird Banding Laboratory data; N=35 band recoveries
af	range (over 4 years) in maximum number of nests active on one day per total area of potential nesting habitat; N=4 survey years; Howard Slough, Great Salt Lake
ag	range (over 4 years) in maximum number of nests active on one day per total area of potential nesting habitat; N=4 survey years; West Layton Marsh, Great Salt Lake
ah	mean population density; N=10 seasons censused; fall, winter, spring; Limantour Estero; Higher density at Limantour vs. Bolinas was due to greater availabitily of sandy habitat at Limantour.
ai	mean population density; N=5 seasons censused; fall, winter, spring; Bolinas Lagoon, Point Reyes National Seashore
aj	number of wintering birds per km of sandy beach surveyed; N=54.5-200.2 km per survey region; Nov 1-Feb 28; mainland coast
ak	number of breeding birds per km of sandy beach surveyed; N=54.5-200.2 km per survey region; mainland coast
al	minimum annual survival rate of marked individuals (2 years and both sexes pooled); N=101 birds; Apr or May to Aug or Sep; Monterey Bay
am	estimated average annual adult survival probability (using Jolly-Seber model); N=361 birds captured over 3 yrs; Great Salt Lake
an	percent annual survival; N=73 birds; Pajaro River Mouth
ao	minimum annual survival rates of marked individuals; N=18 birds; Apr or May to Aug or Sep; Mono Lake (elev. 1,940 m)
ap	percent annual survival; N=56 birds; Pajaro River Mouth
aq	minimum annual survival rate of marked individuals; N=14 birds; Apr or May to Aug or Sep; Point Reyes
ar	defended nesting territory size on salt pan habitat; N=NR; Pajaro River Mouth
as	fledging period, measured from hatch to first flight of at least 3 m; N=22 birds; Pajaro River Mouth
at	months of peak nest initiation activity, 2 years; N=2-15 nests/colony/year; coast
au	period of time from beginning to end of egg laying for one year; N=9 nests; Apr to Sep; Mono Lake (elev. 1,940 m)
av	period between onset and end of egg laying; N=6-84 clutches laid/month; Pajaro River Mouth
aw	egg-laying period; N=3 yrs data collection; Mar to Aug; Great Salt Lake, Davis County
ax	length of egg laying season in two sample years; N=NR; Fuente de Piedra lake, s. Spain
ay	mean dates of spring migrant arrival to breeding grounds; N=44 males, 59 females; Pajaro River Mouth; Period of arrival ranged from Jan 6 to Apr 27.
az	period of migrant arrival to breeding grounds; N=3 yrs data collection; Mar to Aug; Great Salt Lake, Davis County
ba	peaks of migrant arrival to breeding grounds; N=3 yrs data collection; Mar to Aug; Great Salt Lake, Davis County
bb	period during which most color-banded birds left the study area; N=19 birds; spring; Pajaro Dunes, Monterey Bay; See citation for state-wide census data.
bc	timing of first influx of spring migrants to interior breeding areas; N=NR; See citation for winter counts of birds in various inland locations of California.
bd	period between beginning of egg laying and observation of first fledgling for one year; N=NR; Apr to Sep; Mono Lake (elev. 1,940 m); No data collected on date of last fledgling.
be	daily distilled water consumption as percent of body weight; N=NR; Food contained 9.5-12% moisture. Water intake increased with increasing salinity in water.

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